

Application No.: 10/736,090

Attorney Docket No.: 10040070-1

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ATTORNEY DOCKET NO. 10040070-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Charles D. Hoke et al.

Serial No.: 10/736,090

Examiner: P. Vu

Filing Date: December 15, 2003

Group Art Unit: 2871

Title: LIQUID CRYSTAL CELL THAT RESISTS DEGRADATION FROM EXPOSURE TO RADIATION

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TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **\$500.00**.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

<input type="checkbox"/>	one month	\$ 120.00
<input type="checkbox"/>	two months	\$ 450.00
<input type="checkbox"/>	three months	\$1020.00
<input type="checkbox"/>	four months	\$1590.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-1078** the sum of **\$500.00**. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

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Typed Name: Joy H. Perigo

Signature: Joy H. Perigo

Respectfully submitted,

Charles D. Hoke et al.

By

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Loveland, Colorado 80537-0599



PATENT APPLICATION  
ATTORNEY Docket No.: 10040070-1

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:  
Charles D. Hoke et al.

Application No.: 10/736,090

Confirmation No.: 3282

Filed: December 15, 2003

Art Unit: 2871

For: LIQUID CRYSTAL CELL THAT RESISTS  
DEGRADATION FROM EXPOSURE TO  
RADIATION

Examiner: P. Vu

**APPEAL BRIEF**

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on April 20, 2006, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.02:

- |       |   |
|-------|---|
| I.    | Real Party In Interest                                  |
| II.   | Related Appeals, Interferences and Judicial Proceedings |
| III.  | Status of Claims  |
| IV.   | Status of Amendments                                    |
| V.    | Summary of Claimed Subject Matter                       |
| VI.   | Grounds of Rejection to be Reviewed on Appeal           |
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Appendix A	Claims
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Appendix C	Related Proceedings

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Agilent Technologies, Inc.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 46 claims pending in application.

B. Current Status of Claims

1. Claims pending: 3-6, 10-43 and 45-52
2. Claims canceled: 1, 2, 7-9 and 44
3. Claims withdrawn from consideration but not canceled: 3-6 and 19-43
4. Claims allowed: None
5. Claims rejected: 10-18 and 45-52
6. Claims objected to: None

C. Claims On Appeal

The claims on appeal are claims 10-18 and 45-52.

#### IV. STATUS OF AMENDMENTS

Appellant filed an Amendment After Final Rejection on April 20, 2006. The Examiner responded to the Amendment After Final Rejection in an Advisory Action mailed January 24, 2006. In the Advisory Action, the Examiner indicated that Appellants' proposed amendments to claims would be entered. Accordingly, the claims enclosed herein as Appendix A incorporate the amendments reflected in the Appellant filed an Amendment After Final Rejection filed by Appellant on April 20, 2006.

#### V. SUMMARY OF CLAIMED SUBJECT MATTER

According to claim 10, a liquid crystal (LC) cell comprises a transparent top plate (22), a substrate (21) including an active area (23), the substrate and the top plate collectively defining a cavity (pg. 5, para. [0022], lines 1-3), a reservoir (24) in at least one of the substrate and the top plate and connected to the cavity (pg. 5, para. [0020], lines 1-5), liquid crystal material within the cavity and the reservoir (pg. 5, para. [0020], lines 1-2), and an electrode (26a-d) located in the reservoir operable to attract ionic contaminants (pg. 6, para. [0023], lines 1-7), wherein the electrode is a first electrode and the liquid crystal cell additionally comprises a second electrode (26a-d), the first and second electrodes connectable to receive a potential difference (pg. 6, para. [0023], lines 2-3), and wherein the electrodes are operable to generate a field parallel to the top plate (pg. 6, para. [0023], lines 12-13). (All referenced elements appear in Figure 2.)

According to claim 12, a liquid crystal (LC) cell comprises a transparent top plate (22), a substrate (21) including an active area (23), the substrate and the top plate collectively defining a cavity (pg. 5, para. [0022], lines 1-3), a reservoir (24) in at least one of the substrate and the top plate and connected to the cavity (pg. 5, para. [0020], lines 1-5), liquid crystal material within the cavity and the reservoir (pg. 5, para. [0020], lines 1-2), and an electrode (26a-d) located in the reservoir operable to attract ionic contaminants (pg. 6, para. [0023], lines 13-16), wherein the electrode is operable to generate a field parallel to the top plate (pg. 6, para. [0023], lines 12-13). (All referenced elements appear in Figure 2.)

According to claim 15, a liquid crystal cell further comprises a filter (29, Fig. 2) that separates from the liquid crystal material contaminants formed during operation of the LC

cell by decomposition of the liquid crystal material from the liquid crystal material (pg. 6, para. [0024], lines 1-5).

According to claim 45, a liquid crystal (LC) cell comprises a transparent top plate (22), a substrate (21) including an active area (23), the substrate and the top plate collectively defining a cavity (pg. 5, para. [0022], lines 1-3), a reservoir (24) in the substrate and connected to the cavity, said reservoir comprising a trench (pg. 5, para. [0020], lines 1-5), liquid crystal material within the cavity and the reservoir (pg. 5, para. [0020], lines 1-2), and a plurality of electrodes (26a-d) located in said trench operable to attract ionic contaminants and retain said contaminants in said trench (pg. 6, para. [0023], lines 13-16). (All referenced elements appear in Figure 2.)

According to claim 46, electrodes (26a-d) are operable to generate a field parallel to the top plate (pg. 6, para. [0023], lines 12-13).

## VI. GROUNDS OF OBJECTION TO BE REVIEWED ON APPEAL

Whether claims 10-13, 15, and 45-52 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujioka in view of U.S. Patent No. 6,670,753 to Hatano et al. (“Hatano”).

Whether claim 14 properly stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujioka in view of Hatano and further in view of U.S. Patent No. 5,688,708 to Kato et al. (“Kato”).

Whether claims 16-18 properly stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujioka in view of Hatano and further in view of U.S. Patent No. 6,424,388 to Colgan et al. (“Colgan”).

## VII. ARGUMENT

### A. General

Claims 10-18 and 45-52 stand rejected under 35 U.S.C. § 103(a). In order to establish obviousness under 35 U.S.C. § 103(a), three criteria must be met. First, there must be some

suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or combine reference teachings. Second, there must be a reasonable expectation of success. Third, the applied art must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Appellant asserts that the rejections do not satisfy these criteria.

#### B. First Ground of Rejection

Claims 10-13, 15 and 45-52 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujioka in view of Hatano. Appellant asserts that the rejections do not satisfy the criteria required for obviousness.

##### 1. Hatano is Non-analogous Art

In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 1446, 24 U.S.P.Q.2d 1443, 1445 (Fed. Cir. 1992).

Appellant respectfully asserts that Hatano is not analogous to Appellant's invention. The current application teaches the use of electrodes for removing contaminants from a liquid crystal display (LCD) filled with liquid crystal material. In contrast, Hatano teaches the use of electrodes for maintain a vacuum in a cathode ray tube (CRT). Hatano, col. 1, lines 7-10; col. 6, lines 22-24. LCDs are liquid-filled devices, CRTs are evacuated devices, based on older technology. Appellant notes that maintaining a vacuum in a CRT is a different problem to be solved than removing impurities from a liquid. Appellant asserts that Hatano is not reasonably pertinent to either the particular problem addressed by the current application or the reference with which it was combined.

Therefore, Appellant asserts that Hatano is non-analogous art and thus, not a proper reference. A proposed combination which includes Hatano's CRT technology is then improper. Accordingly, Appellant respectfully requests reversal of the 35 U.S.C. § 103(a)

rejections of all claims which depend on a combination of Fujioka with Hatano. Specifically, Appellant respectfully requests reversal of the rejections of claims 10-18 and 45-52.

2. The Final Action Provides Insufficient Motivation to Combine Fujioka with Hatano

Appellant respectfully asserts that the Final Office Action, dated January 24, 2006 ("Final Action"), provides insufficient motivation to combine Fujioka with Hatano. There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998).

As shown above, Hatano teaches the use of electrodes for maintain a vacuum in an evacuated volume in a CRT. In contrast, Fujioka teaches removing impurities from liquid crystal. The problems to be solved in Hatano and Fujioka are markedly different. Appellant notes that neither Fujioka nor Hatano teaches a need for the proposed combination. Therefore, neither the nature of the problem to be solved, nor the teachings of the prior art provides a source for motivation.

Further, the electrodes in Hatano operate on a different scientific principle than those of the current application. Specifically, Hatano's electrodes are comprised of a material that absorbs gas molecules chemically. The Fujioka's electrodes hold particles by their electric charge alone. Hatano, col. 5, line 61 to col. 6, line 11; Fujioka, col. 10, lines 30-34. Applicant respectfully asserts that one of ordinary skill in the art would not look to a CRT system for chemical absorption of molecules in a vacuum to modify an LCD system that retained impurities in a liquid. Thus, there is no motivation in any of the three possible sources listed by *Rouffet*.

Further, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). Rather, it is necessary to ascertain whether the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution,

combination, or other modification. *In re Linter*, 458 F.2d 1013, 1016, 173 U.S.P.Q. 560, 562 (CCPA 1972). As shown above, the reference teachings are not sufficient to make the proposed substitution.

Therefore, Appellant respectfully asserts that the statement of motivation provided by the Final Action is nothing more than a statement that the references could be combined to provide an unsuggested and unknown improvement. See *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002). The motivation to combine Fujioka with Hatano is thus insufficient, rendering the proffered combination improper. Accordingly, for this further reason, Appellant respectfully requests reversal of the 35 U.S.C. § 103(a) rejections of all claims which depend on a combination of Fujioka with Hatano. Specifically, Appellant respectfully requests reversal of the rejections of claims 10-18 and 45-52.

3. The Combination of Fujioka and Hatano Does Not Teach or Suggest All Limitations of Independent Claim 10 and Dependent Claims 11 and 47-49

Independent claim 10 recites “a first electrode [located in the reservoir] and ... a second electrode, the first and second electrodes connectable to receive a potential difference, and wherein the electrodes are operable to generate a field parallel to the top plate.” The proffered combination of Fujioka and Hatano does not teach or suggest at least this aspect of claim 10. That is, the proffered combination does not teach two electrodes that generate a field parallel to a top plate.

The Final Action acknowledges that neither of the references explicitly states that electrodes are configured to generate a field parallel to the top plate, but does allege that the field in Fujioka is “substantially parallel” to a top plate. The Final Action cites element 146 of Hatano as teaching two electrodes in a reservoir, but does not allege that Hatano teaches that a field is parallel to a top plate.

Appellant notes that all Figures of Hatano, namely 106, clearly show electrode pair 146 positioned to generate a field perpendicular to the top plate 104. Hatano teaches that the faceplate is charged positively and electrodes 146 are charged negatively. Compare Hatano, col. 4, line 10 and Figure 1 with col. 6, lines 7-11. Thus, any field generated by electrodes

146 of Hatano would go from the electrodes to the top plate. In contrast, the claim requires the field to be parallel to the top plate. Appellant further notes that the field generated in Fujioka is between substrate 101 and a single electrode 105, contained within element 202, which the Final Action identifies as a top plate. Thus the field in Fujioka also intersects the top plate from below, rather than being parallel to the top plate.

In reply to Appellant's previous arguments that Fujioka does not teach generating a field parallel to the top plate, the Final Action alleges that the field in Fujioka is "substantially parallel" to the top plate. Appellant disagrees, and notes that, according to any of Figures in Fujioka, the field in Fujioka would be perpendicular to the top plate at every point beneath electrode 105, and either slanted or curved in order to span from substrate 101 to the top plate 202 at every other point.

Thus, Fujioka does not teach a first electrode located in a reservoir, nor a second electrode, nor that two electrodes generate a field parallel to a top plate. Hatano teaches that two electrodes generate a field perpendicular to a top plate. A modification of Fujioka with Hatano, therefore, would teach electrodes generating a field perpendicular to a top plate, rather than two electrodes generating a field parallel to a top plate.

Thus, neither Fujioka nor Hatano, either alone or in combination, teaches or suggests all the limitations of claim 10. Therefore, the 35 U.S.C. § 103(a) rejection of claim 10 is improper. See *In re Royka*. Accordingly, Appellant requests the 35 U.S.C. § 103(a) rejection of claim 10 be reversed.

Claims 11 and 47-49 depend from claim 10 and are thus patentable for, at least, the same reasons as independent claim 10. If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). Therefore, Appellant also requests reversal of the 35 U.S.C. § 103(a) rejections of claims 11 and 47-49.

4. The Combination of Fujioka and Hatano Does Not Teach or Suggest All Limitations of Independent Claim 12 and Dependent Claims 13 and 50-52

Independent claim 12 recites “an electrode located in the reservoir ... operable to generate a field parallel to the top plate.” The proffered combination of Fujioka and Hatano does not teach or suggest at least this aspect of claim 12. That is, the proffered combination does not teach an electrode that generates a field parallel to a top plate.

The Final Action acknowledges that neither of the references explicitly states that electrodes are configured to generate a field parallel to the top plate, but does allege that the field in Fujioka is “substantially parallel” to a top plate. The Final Action cites element 146 of Hatano as teaching electrodes in a reservoir, but does not allege that Hatano teaches that a field is parallel to a top plate.

Appellant notes that all Figures of Hatano, namely 106, clearly show electrode pair 146 positioned to generate a field perpendicular to the top plate 104. In contrast, the claim requires the field to be parallel to the top plate. Appellant further notes that the field generated in Fujioka is between substrate 101 and electrode 105, contained within element 202, which the Final Action identifies as a top plate. Thus the field in Fujioka intersects the top plate, rather than being parallel to the top plate.

In reply to Appellant’s previous arguments that Fujioka does not teach generating a field parallel to the top plate, the Final Action alleges that the field in Fujioka is “substantially parallel” to the top plate. Appellant disagrees, and notes that, according to any of Figures in Fujioka, the field in Fujioka would be perpendicular to the top plate at every point beneath electrode 105, and either slanted or curved in order to span from substrate 101 to the top plate 202 at every other point.

Thus, Fujioka does not teach an electrode located in a reservoir, nor that an electrode generates a field parallel to a top plate. Hatano teaches that electrodes generate a field perpendicular to a top plate. A modification of Fujioka with Hatano, therefore, would teach electrodes generating a field perpendicular to a top plate, rather than an electrode generating a field parallel to a top plate

Thus, neither Fujioka nor Hatano, either alone or in combination, teaches or suggests all the limitations of claim 12. See *In re Royka*. Accordingly, Appellant requests the 35 U.S.C. § 103(a) rejection of claim 12 be reversed. Claims 13 and 50-52 depend from claim 12 and are thus patentable for, at least, the same reasons as independent claim 12. See *In re Fine*. Appellant also requests reversal of the 35 U.S.C. § 103(a) rejections of claims 13 and 50-52.

5. The Combination of Fujioka and Hatano Does Not Teach or Suggest All Limitations of Dependent Claim 15

Claim 15 recites “a filter that separates from the liquid crystal material contaminants ....” The proffered combination of Fujioka and Hatano does not teach or suggest at least this aspect of claim 15. That is, the proffered combination does not teach a filter that separates contaminants from the liquid crystal material.

The Final Action points to focus plate 106 in Figure 6 of Hatano. However, Appellant notes that Hatano’s focus plate 106 is used for improving electrical conductivity – not for filtering. Focus plate 106 is thus not a filter as required by claim 15. Fujioka does not teach a filter, and is not relied upon by the Final Action as teaching a filter.

The proffered combination, therefore, does not teach or suggest all the limitations of claim 15. See *In re Royka*. Additionally, claim 15 depends from claim 10, and is thus patentable for, at least, the same reasons as independent claim 10. See *In re Fine*. Accordingly, Appellant requests reversal of the 35 U.S.C. § 103(a) rejection of claim 15.

6. The Combination of Fujioka and Hatano Does Not Teach or Suggest All Limitations of Independent Claim 45

Independent claim 45 recites “a plurality of electrodes located in said trench operable to attract ionic contaminants [from liquid crystal material] and retain said contaminants in said trench.” The proffered combination of Fujioka and Hatano does not teach or suggest at least this aspect of claim 45. That is, the proffered combination does not teach a plurality of electrodes operable to attract and retain liquid crystal material contaminants in a trench.

Fujioka teaches electrode 105 within a top plate, as shown in Figures 2A and 2B of Fujioka. Thus, Fujioka teaches attracting and retaining liquid crystal material contaminants near a top plate. Hatano teaches electrodes operable to maintain a vacuum, rather than attracting and retaining liquid crystal material contaminants. Hatano col. 6, lines 22-24.

Thus, neither Fujioka nor Hatano, either alone or in combination, teaches or suggests all the limitations of claim 45. See *In re Royka*. Accordingly, Appellant requests the 35 U.S.C. § 103(a) rejection of claim 45 be reversed.

7. The Combination of Fujioka and Hatano Does Not Teach or Suggest All Limitations of Dependent Claim 46

Claim 46 recites “said electrodes are operable to generate a field parallel to the top plate.” The proffered combination of Fujioka and Hatano does not teach or suggest at least this aspect of claim 46. That is, the proffered combination does not teach that a plurality of electrodes generates a field parallel to a top plate.

The Final Action acknowledges that neither of the references explicitly states that electrodes are configured to generate a field parallel to the top plate, but does allege that that the field in Fujioka is “substantially parallel” to a top plate. The Final Action cites element 146 of Hatano as teaching electrodes in a reservoir, but does not allege that Hatano teaches that a field is parallel to a top plate.

As shown above, Fujioka does not teach electrodes generating a field parallel to a top plate, and further, a modification of Fujioka with Hatano would teach electrodes generating a field perpendicular to a top plate rather than parallel to a top plate. Thus, neither Fujioka nor Hatano, either alone or in combination, teaches or suggests all the limitations of claim 46. See *In re Royka*. Additionally, claim 46 depends from claim 45, and is thus patentable for, at least, the same reasons as independent claim 45. See *In re Fine*. Accordingly, Appellant requests reversal of the 35 U.S.C. § 103(a) rejection of claim 46.

C. Second Ground of Rejection

Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujioka in view of Hatano and further in view of Kato. Appellant asserts that the rejection does not satisfy the criteria required for obviousness.

Claim 14 depends from claim 12, and thus inherits all the limitations of claim 12. As shown above, the combination of Fujioka and Hatano does not teach or suggest all the limitations of claim 12. Kato is not relied upon to supply the missing limitations. Therefore, the combination of Fujioka, Hatano and Kato does not teach or suggest all the limitations of claim 14. See *In re Royka* and *In re Fine*. Accordingly, Appellant requests reversal of the 35 U.S.C. § 103(a) rejection of claim 14.

D. Third Ground of Rejection

Claims 16-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujioka in view of Hatano and further in view of Colgan. Appellant asserts that the rejections do not satisfy the criteria required for obviousness.

Claims 16-18 depends from claim 12, and thus inherit all the limitations of claim 12. As shown above, the combination of Fujioka and Hatano does not teach or suggest all the limitations of claim 12. Colgan is not relied upon to supply the missing limitations. Therefore, the combination of Fujioka, Hatano and Colgan does not teach or suggest all the limitations of claims 16-18. See *In re Royka* and *In re Fine*. Accordingly, Appellant requests reversal of the 35 U.S.C. § 103(a) rejection of claim 16-18.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A do include the amendments filed by Appellant on April 20, 2006.

IX. EVIDENCE

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted, hence the attached Appendix B is blank.

X. RELATED PROCEEDINGS


No related proceedings are referenced in II. above, and copies of decisions in related proceedings are not provided, hence the attached Appendix C is blank.

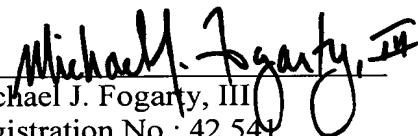
Dated: June 20, 2006

Respectfully submitted,

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service as Express Mail, Airbill No. EV568259208US, on the date shown below in an envelope addressed to: MS Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Dated: June 20, 2006

Signature:   
Joy H. Perigo

By   
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**APPENDIX A**

**Claims Involved in the Appeal of Application Serial No. 10/736,090**

1-2. (Canceled)

3. (Withdrawn) The optical element of claim 1, in which the means for reducing comprises:

an inorganic alignment pattern defined in at least one of the top plate and the substrate, wherein the inorganic alignment pattern is in contact with the liquid crystal material.

4. (Withdrawn) The optical element of claim 1, in which the means for reducing comprises:

a pump operable to pump the liquid crystal material through the cavity across the active area.

5. (Withdrawn) The optical element of claim 4, in which the means for reducing further comprises:

a reservoir defined in at least one of the substrate and the top plate in fluid communication with the cavity; and additional liquid crystal material within the reservoir.

6. (Withdrawn) The optical element of claim 5, in which the means for reducing further comprises:

micro-fluidic channels in fluid communication with the reservoir.

7-9. (Canceled)

10. (Previously Presented) A liquid crystal (LC) cell, comprising:  
a transparent top plate;  
a substrate including an active area, the substrate and the top plate collectively defining a cavity;  
a reservoir in at least one of the substrate and the top plate and connected to the cavity;  
liquid crystal material within the cavity and the reservoir; and  
an electrode located in the reservoir operable to attract ionic contaminants, wherein the electrode is a first electrode and the liquid crystal cell additionally comprises a second electrode, the first and second electrodes connectable to receive a potential difference, and wherein the electrodes are operable to generate a field parallel to the top plate.
11. (Previously Presented) The liquid crystal cell of claim 10, wherein the reservoir has at least one of a depth and a width at least 50 times the distance between the top plate and the substrate.
12. (Previously Presented) A liquid crystal (LC) cell, comprising:  
a transparent top plate;  
a substrate including an active area, the substrate and the top plate collectively defining a cavity;  
a reservoir in at least one of the substrate and the top plate and connected to the cavity;  
liquid crystal material within the cavity and the reservoir; and  
an electrode located in the reservoir operable to attract ionic contaminants, wherein the electrode is operable to generate a field parallel to the top plate.
13. (Previously Presented) The liquid crystal cell of claim 12, wherein a portion of the liquid crystal cell is illuminated, and the reservoir is located in a non-illuminated area of the substrate.
14. (Previously Presented) The liquid crystal cell of claim 12, wherein the reservoir surrounds the active area.

15. (Previously Presented) The liquid crystal cell of claim 12, further comprising:  
a filter that separates from the liquid crystal material contaminants formed during operation of the LC cell by decomposition of the liquid crystal material from the liquid crystal material.

16. (Previously Presented) The liquid crystal cell of claim 12, wherein the liquid crystal cell illuminated with ultraviolet light.

17. (Previously Presented) The liquid crystal cell of claim 12, wherein the substrate comprises a semiconductor.

18. (Previously Presented) The liquid crystal cell of claim 12, wherein the liquid crystal cell is a component of a spatial light modulator.

19. (Withdrawn) The liquid crystal cell of claim 7, further comprising:  
an inorganic alignment pattern defined in at least one of the top plate and the substrate, wherein the inorganic alignment pattern is in contact with the liquid crystal material.

20. (Withdrawn) The liquid crystal cell of claim 7, further comprising:  
a pump operable to pump the liquid crystal material through the cavity across the active area.

21. (Withdrawn) A liquid crystal (LC) cell comprising:  
a top plate;  
a substrate including an active area;  
an inorganic alignment pattern defined in at least one of the top plate and the substrate; and  
liquid crystal material that is located between the top plate and the substrate is aligned by the inorganic alignment pattern.

22. (Withdrawn) The liquid crystal cell of claim 21, wherein the inorganic alignment pattern comprises silicon dioxide.

23. (Withdrawn) The liquid crystal cell of claim 21, wherein the inorganic alignment pattern is a portion of at least one of the top plate and the substrate.

24. (Withdrawn) The liquid crystal cell of claim 21, wherein the inorganic alignment pattern is in a layer that is formed on at least one of the top plate and the substrate.

25. (Withdrawn) The liquid crystal cell of claim 21, wherein the inorganic alignment pattern is defined in the top plate, the liquid crystal cell further comprising: another inorganic alignment pattern that is defined in the substrate.

26. (Withdrawn) The liquid crystal cell of claim 21, wherein the alignment pattern defines a plane and has surface features oriented at an oblique angle to the plane.

27. (Withdrawn) The liquid crystal cell of claim 26, wherein the oblique angle is 5 degrees from the plane.

28. (Withdrawn) The liquid crystal cell of claim 21, wherein the liquid crystal cell illuminated with ultraviolet light.

29. (Withdrawn) The liquid crystal cell of claim 21, wherein the substrate comprises semiconductor.

30. (Withdrawn) The liquid crystal cell of claim 21, wherein the liquid crystal cell is a component of a spatial light modulator.

31. (Withdrawn) The liquid crystal cell of claim 21, further comprising: a reservoir defined in at least one of the substrate and the top plate in fluid communication the liquid crystal material; and additional liquid crystal material within the reservoir.

32. (Withdrawn) The liquid crystal cell of claim 21, further comprising:  
a pump operable to pump the liquid crystal material across the active area.
33. (Withdrawn) A liquid crystal (LC) cell, comprising:  
a top plate;  
a substrate including an active area, the substrate and the top plate collectively defining a cavity;  
liquid crystal material within the cavity; and  
a pump operable to pump the liquid crystal material through the cavity across the active area.
34. (Withdrawn) The liquid crystal cell of claim 33, wherein the pump is located in one of (a) inside and (b) outside the cavity.
35. (Withdrawn) The liquid crystal cell of claim 33, wherein the pump is one of a rotary pump, a syringe pump, and an electro-kinetic pump.
36. (Withdrawn) The liquid crystal cell of claim 33, further comprising:  
a liquid crystal source for providing liquid crystal material to the cavity, and  
a liquid crystal destination for receiving liquid crystal material from the cavity.
37. (Withdrawn) The liquid crystal cell of claim 33, wherein the active area has a longer axis and a shorter axis, the LC cell further comprising:  
micro-fluidic channels disposed parallel to the longer axis between which the liquid crystal material flows parallel to the shorter axis.
38. (Withdrawn) The liquid crystal cell of claim 37, further comprising:  
an outer seal and an inner seal located within the outer seal, the inner seal directing flow of the liquid crystal material across the active area parallel to the shorter axis.

39. (Withdrawn) The liquid crystal cell of claim 33, wherein the liquid crystal cell illuminated with ultraviolet light.

40. (Withdrawn) The liquid crystal cell of claim 33, wherein the substrate comprises semiconductor.

41. (Withdrawn) The liquid crystal cell of claim 33, wherein the liquid crystal cell is a component of a spatial light modulator.

42. (Withdrawn) The liquid crystal cell of claim 33, further comprising:  
a reservoir defined in at least one of the substrate and the top plate in fluid communication with the cavity; and  
additional liquid crystal material within the reservoir.

43. (Withdrawn) The liquid crystal cell of claim 33, further comprising:  
an inorganic alignment pattern defined in at least one of the top plate and the substrate, wherein the inorganic alignment pattern is in contact with the liquid crystal material.

44. (Canceled)

45. (Previously Presented) A liquid crystal (LC) cell, comprising:  
a transparent top plate;  
a substrate including an active area, the substrate and the top plate collectively defining a cavity;  
a reservoir in the substrate and connected to the cavity, said reservoir comprising a trench;  
liquid crystal material within the cavity and the reservoir; and  
a plurality of electrodes located in said trench operable to attract ionic contaminants and retain said contaminants in said trench.

46. (Previously Presented) The liquid crystal cell of claim 45 wherein said electrodes are operable to generate a field parallel to the top plate.

47. (Previously Presented) The liquid crystal cell of claim 10 wherein said electrodes are located on said substrate and operable to attract ionic contaminants away from said top plate.

48. (Previously Presented) The liquid crystal cell of claim 47 wherein said electrodes are located near a furthest point from said top plate.

49. (Previously Presented) The liquid crystal cell of claim 11 wherein said electrodes are located on said substrate near a furthest point from said top plate.

50. (Previously Presented) The liquid crystal cell of claim 12 further comprising a second electrode, said second electrode being located in the reservoir.

51. (Previously Presented) The liquid crystal cell of claim 50 wherein said electrodes are located on said substrate and operable to attract ionic contaminants away from said top plate.

52. (Previously Presented) The liquid crystal cell of claim 51 wherein said electrodes are located near a furthest point from said top plate.

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**APPENDIX B**

**Evidence: None**

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**APPENDIX C**

**Related Proceedings: None**